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Socioeconomic Characteristics and Income Inequality among Kinnow Growers: A Comparative Study of Fazilka and Sriganganagar

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Abstract

This study examines the socioeconomic characteristics of Kinnow growers in Fazilka (Punjab) and Sriganganagar (Rajasthan) using primary data collected during the 2020–21 crop year from 480 growers (240 in each district). Descriptive statistics, cross-tabulation, chi-square tests, Cramér's V, Lorenz curves, and Gini coefficients were used to compare landholding, demographic characteristics, household conditions, and income distribution. The results show that Kinnow cultivation is concentrated among medium and semi-medium farmers. These categories together account for 87.50% of sampled growers in Fazilka and 86.67% in Sriganganagar. Mean landholding is higher in Sriganganagar (6.85 ha) than in Fazilka (5.34 ha), while landholding inequality is higher in Fazilka (Gini = 0.626) than in Sriganganagar (0.510). Growers in both districts are predominantly middle-aged, married, and formally educated. Mean family size is 6.5875 members in Fazilka and 6.7208 in Sriganganagar. Mean monthly household electricity consumption is also similar at 475 and 474.16 units, respectively. Mean annual income is slightly higher in Fazilka (₹5.8125 lakh) than in Sriganganagar (₹5.525 lakh), whereas income inequality is substantially lower in Sriganganagar (Gini = 0.202) than in Fazilka (Gini = 0.352). The chi-square results indicate a statistically significant association between landholding size and annual income in both districts. The findings highlight the socially selective nature of Kinnow cultivation and the need for targeted credit, extension, market-linkage, skill-development, and smallholder inclusion measures.

Keywords: *Kinnow Growers, Socioeconomic Characteristics, Landholding, Income Inequality, Gini Coefficient, Fazilka, Sriganganagar.*

Introduction

Kinnow mandarin is an important citrus crop in India, and Punjab and Rajasthan are among the major Kinnow-growing regions. The two regions share broadly comparable agro-climatic conditions but differ in the socioeconomic structure of growers, scale of cultivation, and access to resources. A comparative assessment of growers at the primary level is therefore useful for understanding the distribution of productive resources and the socioeconomic conditions associated with Kinnow cultivation.

Fazilka district in Punjab, particularly the Abohar region, is widely recognized for Kinnow cultivation, while Sriganganagar is the major Kinnow-producing district of Rajasthan. The study area represents two important Kinnow production systems with substantial grower populations. Differences in farm size, income distribution, education, household characteristics, and access to agricultural services may influence growers' capacity to adopt improved technologies and respond to market and production risks. Khan et al. (2012) investigated the impact of Kinnow yield losses on the socioeconomic conditions of farming households in Tehsil Sargodha, Punjab, Pakistan. Based on primary data from 200 growers, the study reported that 91.5% of respondents experienced negative socioeconomic effects due to Kinnow yield losses. The chi-square analysis

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further indicated a negative association between yield losses and the socioeconomic uplift of the farming community. The study emphasized awareness, extension training, improved cultural practices.

Previous studies have examined the socioeconomic characteristics of Kinnow growers in Rajasthan and Punjab, but comparative evidence based on a common sampling framework remains limited. Bannor and Sharma (2019) examined Kinnow growers in Rajasthan, while Kaur, H. (2016) examined socioeconomic conditions of Kinnow growers in Punjab. Sohi and Matharu (2018) examined the adoption and perceived constraints associated with Kinnow cultivation in Barnala district of Punjab, India. Although the region possesses favourable environmental conditions for Kinnow production, farmers faced several constraints related to plantation, yield, quality, planting material, technical guidance, socio-cultural factors, and post-harvest management. The separate regional focus and limitations in sample coverage make direct comparison difficult. A comparative analysis of growers in Fazilka and Sriganganagar can therefore provide useful evidence on the distribution of land and income, demographic characteristics, household conditions, and the relationship between farm size and income. The present study addresses this gap using comparable primary data from both regions.

Methodology

Primary data were collected through personal interviews using a structured interview schedule during the 2020–21 crop year. Two major Kinnow-producing districts were selected purposively: Sriganganagar in Rajasthan and Fazilka in Punjab. From Sriganganagar district, Srikaranpur and Sriganganagar blocks were selected; from Fazilka district, Abohar and Khuian-Sarwar blocks were selected. Six Kinnow-growing villages were selected purposively from each block, giving 24 villages in total, with 12 villages in each district. From each village, 20 Kinnow growers were selected randomly from the available grower list. Thus, the final sample comprised 240 growers from each district and 480 growers overall. Frequencies, percentages, cross-tabulation, chi-square tests, and measures of association were used to analyse categorical variables. Lorenz curves and Gini coefficients were used to assess inequality in landholding and annual income. The analysis is based on sampled respondents and should not be interpreted as a district-level census estimate. The theoretical perspective of Schultz (1964) is also relevant to the socioeconomic analysis of Kinnow growers. Schultz argued that transforming traditional agriculture requires investment in new material inputs as well as investment in farm people. This perspective implies that farmers' socioeconomic characteristics, resource ownership and access to knowledge and productive inputs can influence their capacity to benefit from agricultural opportunities. Accordingly, examining differences in landholding, education, household characteristics and income among Kinnow growers provides an important basis for understanding the socioeconomic structure of Kinnow cultivation in different production regions.

Results and Discussion

- **Landholding**

Table 1 shows the landholding distribution of the 240 sampled Kinnow growers in each district. Kinnow cultivation is concentrated among medium and semi-medium farmers. In Fazilka, medium farmers constitute 50.42% and semi-medium farmers 37.08%, together accounting for 87.50% of respondents. In Sriganganagar, medium farmers account for 72.92% and semi-medium farmers 13.75%, together representing 86.67% of respondents. Marginal and small farmers constitute only 7.50% in Fazilka and 2.50% in Sriganganagar. Large farmers account for 5.00% and 10.83%, respectively. The sampled growers in Sriganganagar collectively operated 1,644 ha, compared with 1,282 ha in Fazilka, and the mean holding was higher in Sriganganagar (6.85 ha) than in Fazilka (5.34 ha).

Table 1: Landholding of Respondent Kinnow Growers

Type of Farmer	Fazilka (Punjab)		Sriganganagar (Rajasthan)	
	Number	Percentage Share	Number	Percentage Share
Marginal	3	1.25	1	0.417
Small	15	6.25	5	2.083
Semi medium	89	37.083	33	13.75
Medium	121	50.417	175	72.917
Large	12	5	26	10.833
Total	240	100	240	100
Gini coefficient value	0.626		0.51	
Total land of respondents	1282 ha.		1644 ha.	
Mean	5.34 ha.		6.85 ha.	
S.D.	2.617		2.69	

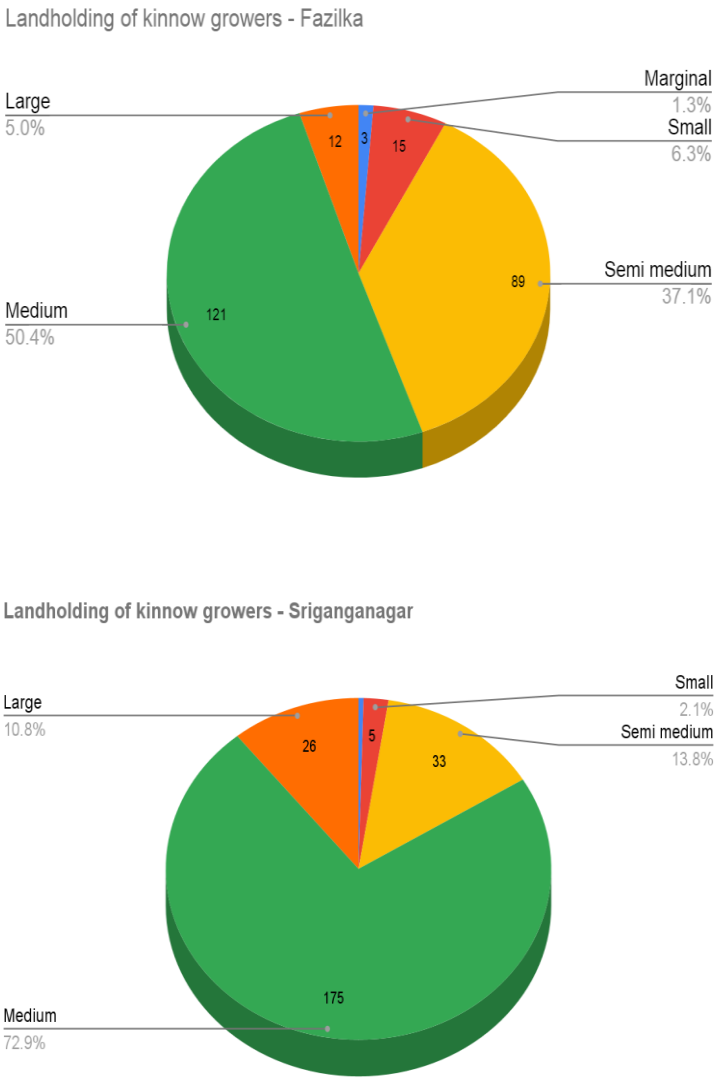


Figure 1: Landholding of Kinnow growers by size group

The Gini coefficients of 0.626 and 0.510 indicate substantial land concentration, with greater inequality in Fazilka. These results suggest that Kinnow cultivation in the sample is relatively resource-intensive and is concentrated among growers with medium and larger landholdings.

- **Age-wise Distribution**

Table 2 compares the age distribution of the 240 sampled growers in each district. The distributions are similar and concentrated in the middle-age groups. The modal class is 35–40 years, comprising 33.33% of growers in Fazilka and 32.50% in Sriganganagar. The 30–45 age range includes 73.75% of growers in Fazilka and 75.00% in Sriganganagar. The mean age is 39.54 years (SD = 6.49) in Fazilka and 38.85 years (SD = 6.21) in Sriganganagar. The concentration of growers in the middle-age groups suggests that Kinnow cultivation in the sample is largely managed by experienced farmers. The relatively small representation of younger growers may have implications for future succession and technology adoption.

Table 2: Age-wise Distribution of Respondent Kinnow Growers

Age	Fazilka	Sriganganagar
20-25	**1**	**2**
25-30	16	19
30-35	37	41
35-40	80	78
40-45	60	61
45-50	28	28
50-55	18	11
Total	240	240
Mean	39.54	38.85
Standard deviation	6.49	6.21
Minimum	24	25
Maximum	55	55
Range	31	30

- **Marital Status**

Table 3: Marital Status of Respondent Kinnow Growers

Marital Status	Fazilka (Punjab)		Sriganganagar (Rajasthan)	
	No. of Responses	Percentage	No. of Responses	Percentage
Married	235	97.92	234	97.5
Single	5	2.083	6	2.5
Total	240	100	240	100

The marital-status distribution is highly similar across the two districts. In Fazilka, 235 respondents (97.92%) were married and 5 (2.08%) were single. In Sriganganagar, 234 respondents (97.50%) were married and 6 (2.50%) were single. Thus, approximately 98% of sampled growers in both districts were married. Because no formal test of difference is reported here, the comparison is presented descriptively rather than as a statistical significance test.

- **Caste Category**

Table 4 reveals a substantial difference in the caste composition of sampled Kinnow growers between Fazilka and Sriganganagar. In Fazilka, growers belonging to the General category constitute the largest group in both Khuian-Sarwar (78) and Abohar (81), whereas OBC growers account for 25 and 23 respondents, respectively. SC growers number 17 in Khuian-Sarwar and 16 in Abohar. Thus, the caste composition of the two blocks within Fazilka is broadly similar. The contrasting caste composition of Kinnow growers reflects differences in the social structure of the sampled farming communities across the two regions. The predominance of General-category growers in Fazilka and OBC growers in Sriganganagar indicates that Kinnow cultivation is undertaken by farmers belonging to different social groups in the two study areas.

Table 4: Caste-Category Distribution of Respondent Kinnow Growers

Caste Category	Fazilka		Sriganganagar	
	Khuian Sarwar	Abohar	Srikaranpur	Sriganganagar
General	78	81	12	14
OBC	25	23	90	89
SC	17	16	18	17
ST	0	0	0	0

- **Education**

Table 5 presents the educational profile of the respondents. In Fazilka, 89 respondents had completed graduation and 18 had postgraduate education; the corresponding figures for Sriganganagar were 89 and 31. Only three respondents in Fazilka and one in Sriganganagar reported no formal schooling. Overall, the sample exhibits a high level of formal education, which may support information access, technology adoption, and market participation. However, education alone should not be interpreted as evidence of actual technology adoption without direct measures. Schultz (1975), based on

a comparative examination of the agricultural economic histories of California, Brazil and Canada, argued that farmers' level of education is positively associated with successful adaptation to disequilibria. The finding suggests that education enhances farmers' ability to recognize and respond to changes in economic conditions, including changes in technology, prices and resource availability.

Table 5: Educational Status of Respondent Kinnow Growers

Education	Fazilka (Punjab)	Sriganganagar (Rajasthan)
No Formal Schooling	**3**	**1**
Primary	6	2
Upper primary	17	15
Secondary	43	38
Senior secondary	64	64
Graduation	89	89
Post Graduation	18	31
Total	240	240

This perspective is particularly relevant to Kinnow cultivation, where growers face changing production technologies, market conditions and production risks. Thus, differences in educational attainment among Kinnow growers may influence their capacity to adapt to changing agricultural conditions and improve their economic outcomes.

- **Family Size**

Table 6 presents the household-size distribution of 240 respondent Kinnow growers in each district. The distributions are similar and concentrated in medium-sized households. The modal household size is five members, reported by 58 growers (24.17%) in Fazilka and 54 (22.50%) in Sriganganagar. Households with 5–8 members account for 65.42% of respondents in Fazilka and 66.25% in Sriganganagar. The mean family size is 6.5875 members in Fazilka and 6.7208 members in Sriganganagar. Based on the frequency distributions in Table 6, the sample standard deviations are 2.1649 and 2.1554, respectively. These values replace the earlier reported SDs of 4.67 and 4.63, which are not consistent with the displayed frequency distributions. The similarity in household size suggests broadly comparable household structures across the two districts.

Table 6: Household Size of Respondent Kinnow Growers

No. of Members	Fazilka (Punjab)	Sriganganagar (Rajasthan)
2	**1**	**1**
3	7	5
4	26	23
5	58	54
6	45	48
7	28	31
8	26	26
9	19	21
10	15	14
11	11	12
12	4	5
Mean	**6.5875**	**6.7208**
Standard deviation (S.D.)	**2.1649**	**2.1554**

- **Household Electricity Consumption**

Table 7 presents monthly household electricity consumption among the sampled Kinnow growers. The modal category is 400–600 units in both districts, accounting for 34.17% of respondents in Fazilka and 37.08% in Sriganganagar. Mean consumption is 475 units in Fazilka and 474.16 units in Sriganganagar. The coefficients of variation are approximately 45.7% and 43.5%, indicating considerable heterogeneity in household electricity consumption. Because electricity use can reflect several factors—including household size, appliances, income, and other consumption patterns—it should be treated as an indicative household-condition measure rather than a standalone measure of welfare.

Table 7: Monthly Household Electricity Consumption of Respondent Kinnow Growers

Monthly Electricity Consumption (Units)	Fazilka (Punjab)		Sriganganagar (Rajasthan)	
	No. of Farmers	Percentage	No. of Farmers	Percentage
0 to 200	18	7.5	13	5.42
200 to 400	78	32.5	81	33.75
400 to 600	82	34.17	89	37.08
600 to 800	44	18.33	44	18.33
800 to 1000	14	5.83	7	2.92
1000 to 1200	4	1.67	6	2.5
Total	240	100	240	100
Mean Consumption	475		474.16	
S.D.	216.89		206.15	

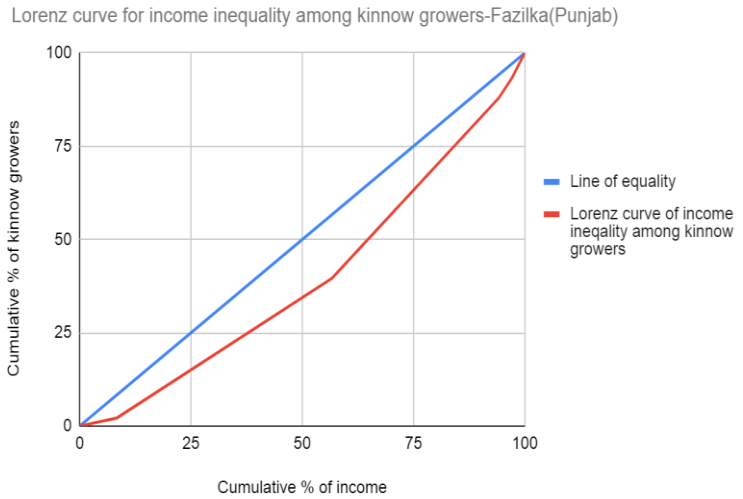
- **Annual Income**

Table 8 presents the annual income distribution of the 240 sampled growers in each district. The modal income class is ₹3–6 lakh, containing 48.33% of respondents in Fazilka and 52.92% in Sriganganagar. The ₹3–9 lakh range contains 85.83% of respondents in Fazilka and 85.42% in Sriganganagar. Mean annual income is slightly higher in Fazilka (₹5.8125 lakh) than in Sriganganagar (₹5.525 lakh).

Table 8: Annual Income of Respondent Kinnow Growers

Annual Income (₹ Lakh) (In lakh Rupees)	Fazilka (Punjab)		Sriganganagar (Rajasthan)	
	No. of Responses	Percentage	No. of Responses	Percentage
0 to 3	20	8.33	24	10
3 to 6	116	48.33	127	52.92
6 to 9	90	37.5	78	32.5
9 to 12	7	2.92	5	2.08
12 and above	7	2.92	6	2.5
Total	240	100	240	100
Chi-square value^	296.57 ($p < 0.001$)		116.70 ($p < 0.001$)	
Cramer's V^	0.556		0.349	
Mean income	5.8125		5.525	
S.D.	2.41		2.356	
Gini coefficient	0.352		0.202	

Note: Chi-square statistics and Cramér's V refer to the association between landholding size and annual income.



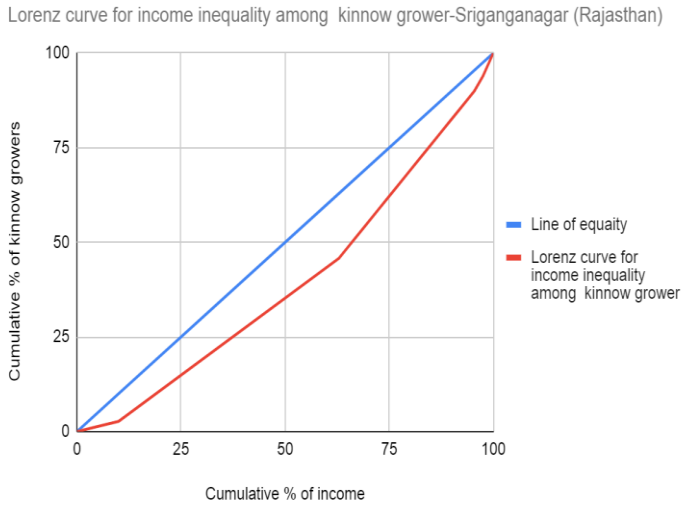


Figure 2: Lorenz Curves for Income Inequality

Income inequality is higher in Fazilka (Gini = 0.352) than in Sriganganagar (Gini = 0.202). The reported chi-square statistics refer to the relationship between landholding size and annual income, not to a test of uniformity of the income distribution. With five landholding categories and five income categories, df = 16. The corresponding chi-square values are highly statistically significant ($p < 0.001$) in both districts. Using the standard Cramér's V formula, $V = \sqrt{[\chi^2/\{N(k-1)\}]}$, where N = 240 and k = 5, gives $V \approx 0.556$ for Fazilka and $V \approx 0.349$ for Sriganganagar. These values indicate a stronger association between landholding size and annual income in Fazilka than in Sriganganagar.

Conclusion

This study compared the socioeconomic characteristics of Kinnow growers in Fazilka (Punjab) and Sriganganagar (Rajasthan) using primary data from 480 sampled growers. The findings show that Kinnow cultivation is concentrated among medium and semi-medium farmers, with very limited representation of marginal and small growers. Sriganganagar has a higher mean landholding among sampled growers, whereas Fazilka exhibits greater landholding inequality. The two districts have broadly similar age, marital-status, family-size, and household electricity-consumption profiles. The sampled growers are predominantly middle-aged, married, and formally educated. Mean annual income is slightly higher in Fazilka, but income inequality is substantially higher there than in Sriganganagar. The chi-square analysis indicates a statistically significant association between landholding size and annual income in both districts, with a stronger association in Fazilka when Cramér's V is calculated from the reported chi-square values and the 5×5 classification. Overall, the results indicate that Kinnow cultivation in the sampled areas is socially and resource-selective. Policy interventions should therefore strengthen access to institutional credit, irrigation, extension services, market information, cooperative marketing, skill development, and opportunities for smaller and younger growers. Because the analysis is based on sampled respondents rather than district-level census data, the findings should be interpreted as applicable to the sampled growers. Future research could use larger samples and longitudinal data to examine changes in socioeconomic conditions and the effects of policy interventions.

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